

# PATENT ABSTRACTS OF JAPAN

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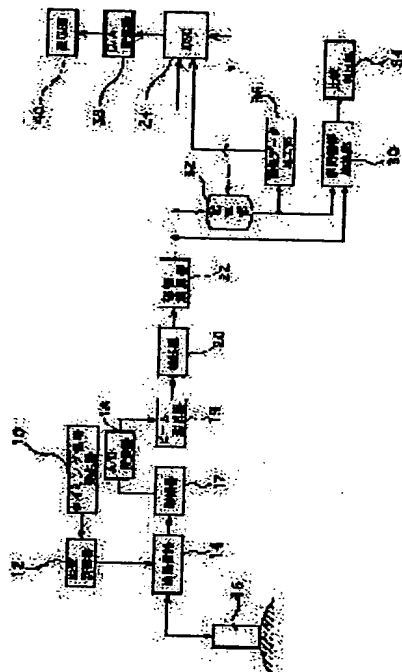
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 (22)Date of filing : 22.04.1999 (72)Inventor : OGATA FUTOSHI  
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## (54) ULTRASONIC DIAGNOSTIC DEVICE

### (57)Abstract:

PROBLEM TO BE SOLVED: To easily compare an image obtained at present with a reference image in the past by an ultrasonic diagnostic device.

SOLUTION: Display attributes such as hues and the like of a tomographic image in the past stored in a storing part 32 are converted by an image data processing part 36. For example, the colored reference image is superimposed with a monochrome image of interest presently obtained from a probe 16 at DSC 24 to be displayed on a display part 40 as an overlay image integrated into one image. Moreover, a correlation index calculation part 30 calculates a correlation coefficient of data between the image of interest and the reference image. If a comparator part 34 detects that the correlation coefficient has exceeded a threshold, the image of interest in the overlay image is kept at a standstill at an image similar to the reference image, and the image of interest at this time is stored in a storage part 32.



## LEGAL STATUS

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CLAIMS

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## [Claim(s)]

[Claim 1] The ultrasonic diagnostic equipment carry out containing an overlay image generation means generate the overlay image on top of which a reference image storage means memorize the reference image based on the echo data of the past obtained by transmission-and-reception wave of an ultrasonic wave, an attention image generation means generate an attention image based on the echo data obtained now, and said reference image and said attention image of each other laid identifiable, and a display means display said overlay image as the feature.

[Claim 2] It is the ultrasonic diagnostic equipment characterized by making identifiable said reference image on which said overlay image generation means was put in an ultrasonic diagnostic equipment according to claim 1 using a hue, and said attention image of each other.

[Claim 3] It is the ultrasonic diagnostic equipment characterized by making identifiable said reference image on which said overlay image generation means was put in an ultrasonic diagnostic equipment according to claim 1 using brightness, and said attention image of each other.

[Claim 4] It is the ultrasonic diagnostic equipment which has an outline emphasis means to emphasize an outline of said reference image, in an ultrasonic diagnostic equipment according to claim 1, and is characterized by said overlay image generation means laying a reference image which had said outline emphasized on top of said attention image.

[Claim 5] It is the ultrasonic diagnostic equipment characterized by memorizing said reference image with which binarization of said reference image storage means was carried out in an ultrasonic diagnostic equipment according to claim 1.

[Claim 6] An ultrasonic diagnostic equipment carry out containing a reference image storage means memorize a reference image based on echo data of the past obtained by transmission-and-reception wave of an ultrasonic wave, an attention image generation means generate an attention image based on echo data obtained now, and a correlation assessment means compute a correlation index of said reference image and said attention image as the feature.

[Claim 7] It is the ultrasonic diagnostic equipment which has a binarization means which carries out binarization of said reference image and said attention image, respectively in an ultrasonic diagnostic equipment according to claim 6, and is characterized by said correlation assessment means computing said correlation index of said reference image by which binarization was carried out, and said attention image by which binarization was carried out.

[Claim 8] It is the ultrasonic diagnostic equipment which has an outline extract means to extract an outline from said reference image and said attention image, respectively, in an ultrasonic diagnostic equipment according to claim 6, and is characterized by said correlation assessment means computing said correlation index based on a comparison between said outlines extracted from said reference image and said attention image, respectively.

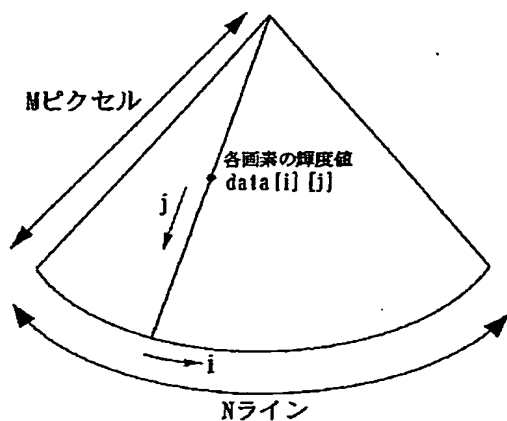
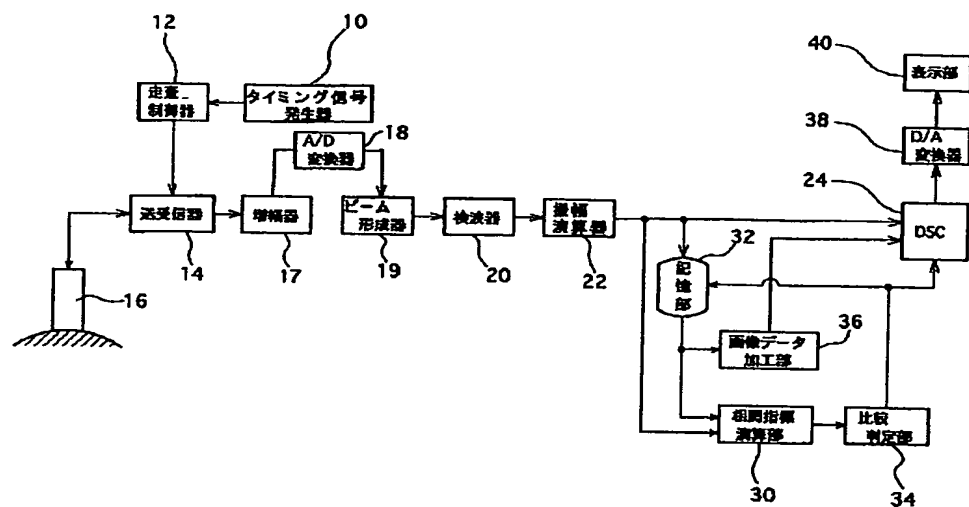
[Claim 9] An ultrasonic diagnostic equipment characterized by having an index display means to display said correlation index on either of claim 6 to claims 8 in an ultrasonic diagnostic equipment of a publication.

[Claim 10] An ultrasonic diagnostic equipment characterized by detecting that said correlation index exceeded a predetermined threshold, and having an image storing means to store said attention image in a storage means in an ultrasonic diagnostic equipment given in either of claim 6 to claims 9.

[Claim 11] An ultrasonic diagnostic equipment characterized by detecting that said correlation index exceeded a predetermined threshold, and having an image frieze means to freeze said attention image whose animation is displayed by display in an ultrasonic diagnostic equipment given in either of claim 6 to claims 10.

[Claim 12] An ultrasonic diagnostic equipment characterized by having a correlation assessment means to compute a correlation index of said reference image and said attention image, and an image frieze means to freeze said attention image whose animation detects that said correlation index exceeded a predetermined threshold, and is displayed by display in an ultrasonic diagnostic equipment given in either of claim 1 to claims 5.

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[Translation done.]

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$$R = \frac{\sum_{i=0}^{N-1} \sum_{j=0}^{M-1} (data[i][j] - \overline{data}) \cdot (data'[i][j] - \overline{data'})}{\sqrt{\sum_{i=0}^{N-1} \sum_{j=0}^{M-1} (data[i][j] - \overline{data})^2 \cdot \sum_{i=0}^{N-1} \sum_{j=0}^{M-1} (data'[i][j] - \overline{data'})^2}}$$

$$\overline{data} = \frac{1}{NM} \sum_{i=0}^{N-1} \sum_{j=0}^{M-1} data[i][j], \quad \overline{data'} = \frac{1}{NM} \sum_{i=0}^{N-1} \sum_{j=0}^{M-1} data'[i][j]$$